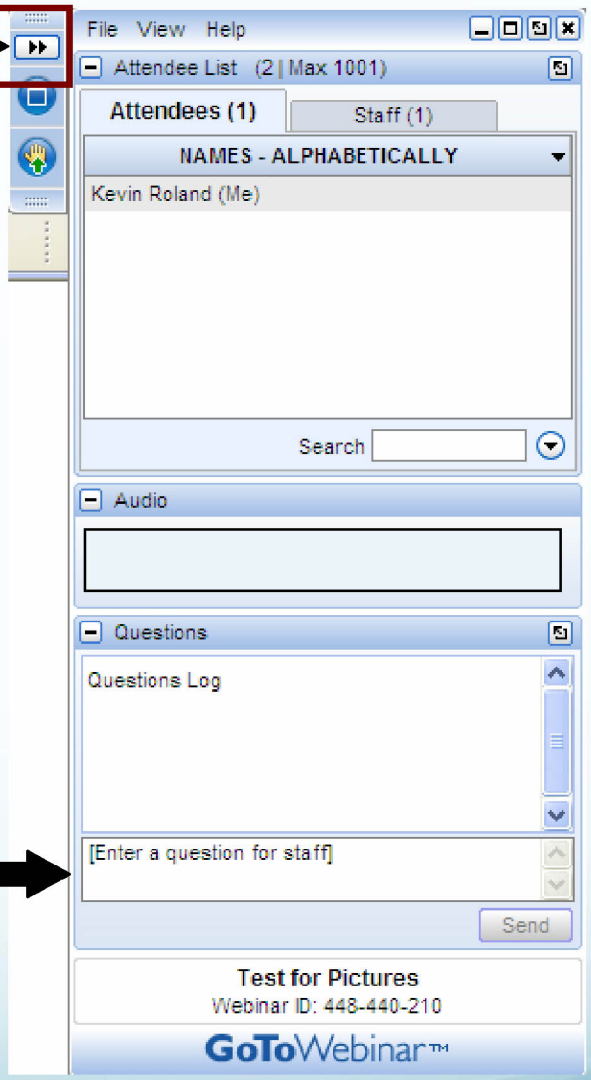
CHESAPEAKE BAY TMDL
Restoring Local Waters and the Chesapeake Bay

Webinar No. 2 in Series

March 25, 2010

- **Click the double arrow to show or hide your control panel**



- **Type your questions here.**

  (Indicate organization)

  Note: Because of the large audience, not all questions will be answered, but they will be saved, and your questions will help drive future events and could contribute to a FAQ.

Technical Issues?

Contact:

- **Citrix Global Customer Support**

  1-800-263-6317

Today's Presenters

- **Bob Koroncai**, Chesapeake Bay TMDL Manager, EPA Region 3
- **Rich Batiuk**, Associate Director for Science, Chesapeake Bay Program Office (CBPO), EPA Region 3
- **Ann Swanson**, Executive Director, Chesapeake Bay Commission

AGENDA

- Welcome, Opening Remarks – Bob
- Key Updates and Previews – Bob
- Model Presentation – Rich
- CBC Perspective – Ann
- Questions and Answers

Schedule of Next Steps and Opportunities to Directly Participate

Bob Koroncai
Chesapeake Bay TMDL Manager
U.S. EPA Region 3 Water Protection Division
Co-chair of Chesapeake Bay Program's
Water Quality Goal Implementation Team

Bay TMDL News Flash!
(updates in the last month)

- $11.2 Million in supplemental Bay grants to the states
- $400,000 in WIP contractual support to states
- $300,000 for local WIP pilots
  - District of Columbia
  - MD: Anne Arundel and Caroline Counties
  - NY: Chemung River Watershed
  - PA: Conewago Creek Watershed
  - VA: Prince William County and Rivanna River Basin
  - WV: Berkeley, Jefferson, and Morgan Counties

Next on the Bay TMDL Schedule

- **June 1**: States, District submit draft Watershed Implementation Plans
- **August 1**: States, District submit revised draft Watershed Implementation Plans
- **August 15-October 15**: Bay TMDL public review/comment period
- **November 1**: States, District submit final Phase 1 Watershed Implementation Plans
- **December 31**: EPA publishes the Bay TMDL

Opportunities to Directly Participate

- Call your state's watershed implementation plan point of contact (see next slide)
- Join in the monthly Bay TMDL webinars
  - Next one: **May 4**, 10 a.m.
- Get better informed: www.epa.gov/chesapeakebaytmdl
- **August 15-October 15**: Bay TMDL public review/comment period
  - Public meetings/webinars
- Contact your friendly EPA Bay TMDL colleagues (we don't bite or even bark!)

Watershed Implementation Plan Contacts

- Delaware: Jennifer Volk, DNREC
- District of Columbia: Monir Chowdhury, DOE
- Maryland: Rich Eskin and Tom Thornton, MDE
- New York: Ron Entringer and Peter Freehafer, DEC
- Pennsylvania: Pat Buckley, DEP
- Virginia: Alan Pollock, DEQ and Russ Perkinson, DCR
- West Virginia: Teresa Koon, DEP

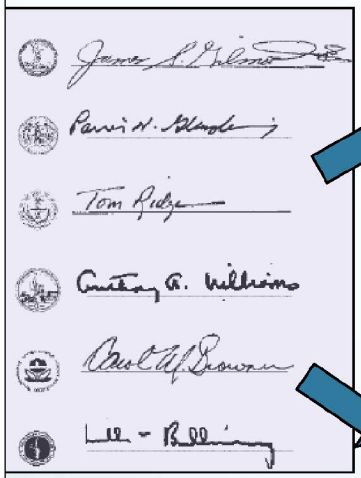
Contact information--phone number, email address--is available at:
www.epa.gov/chesapeakebaytmdl

Suite of Chesapeake Bay Models and Their Roles in Supporting Bay TMDL Decision-Making

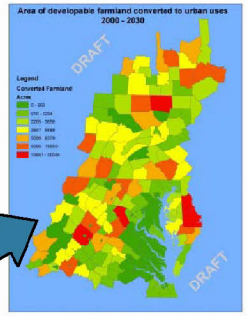
Rich Batiuk
Associate Director for Science
U.S. EPA Region 3
Chesapeake Bay Program Office

Roles of the Bay Models In Decision-Making

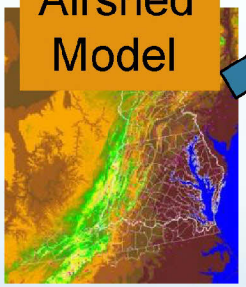
Management Actions



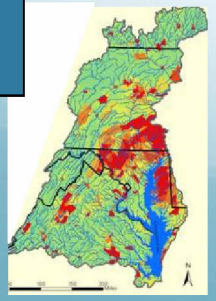
Land Use Change Model



Airshed Model

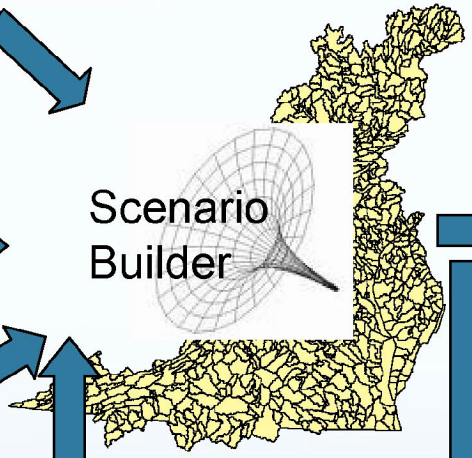


SPARROW Model

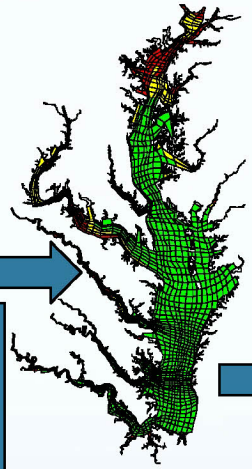


Bay Watershed Model

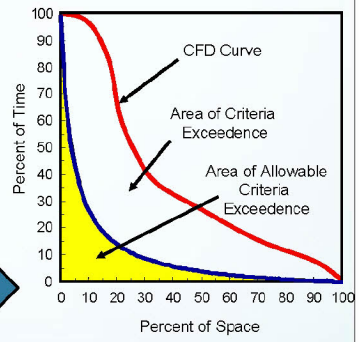
Scenario Builder



Bay WQ/ Sediment Transport Model



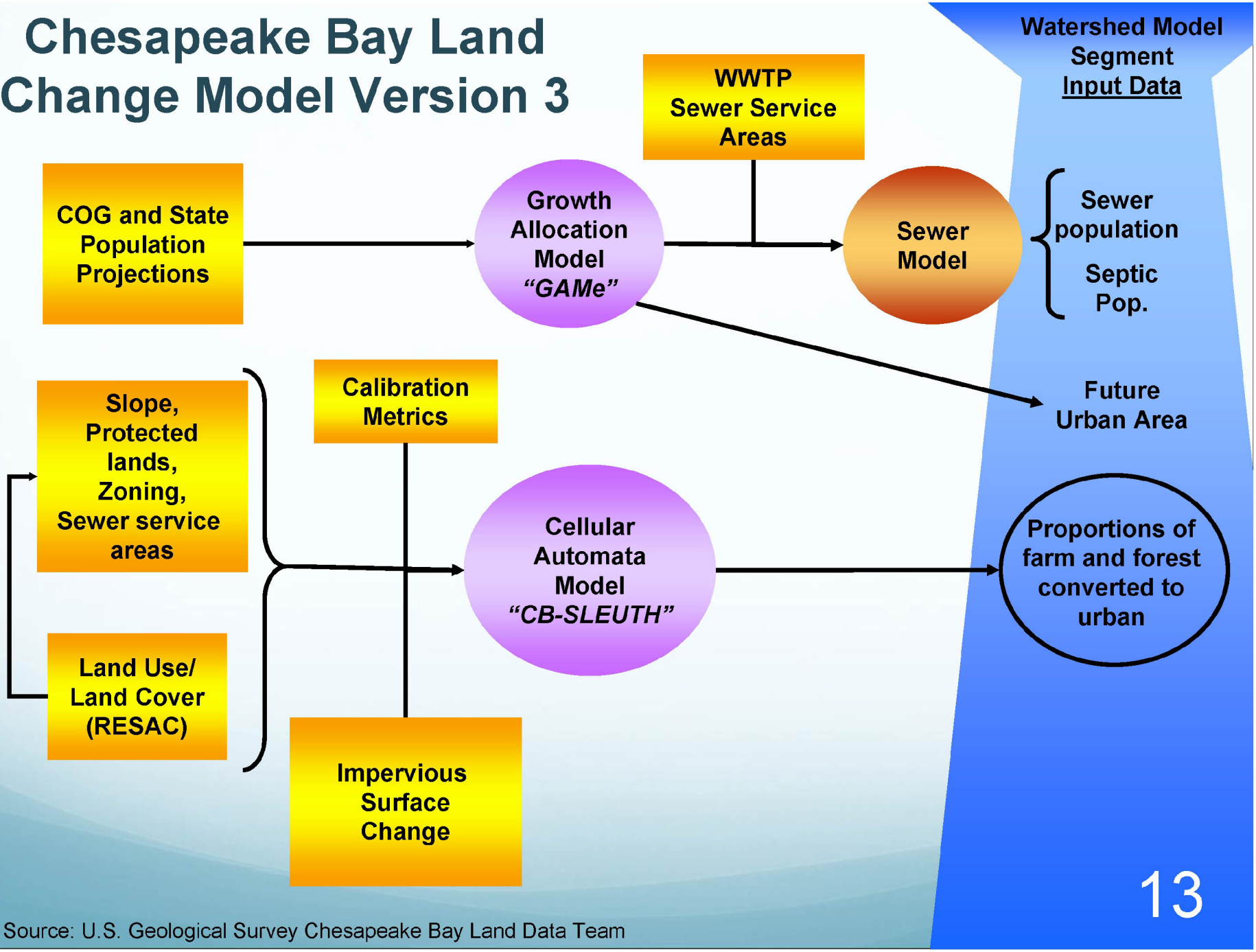
Bay WQ Criteria Assessment Procedures



Water Quality Effects

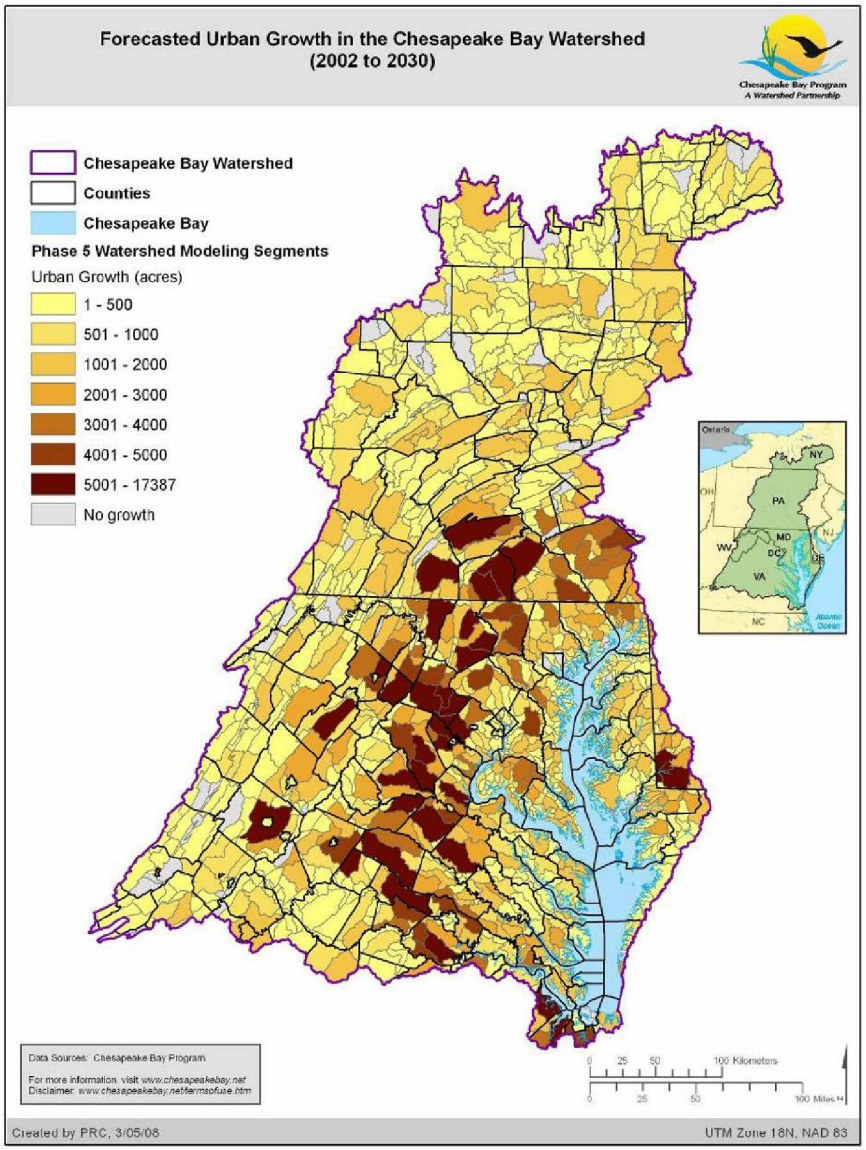
Load Allocations

Chesapeake Bay Land Change Model Version 3



Source: U.S. Geological Survey Chesapeake Bay Land Data Team

Forecasted Urban Growth (2000 to 2030)

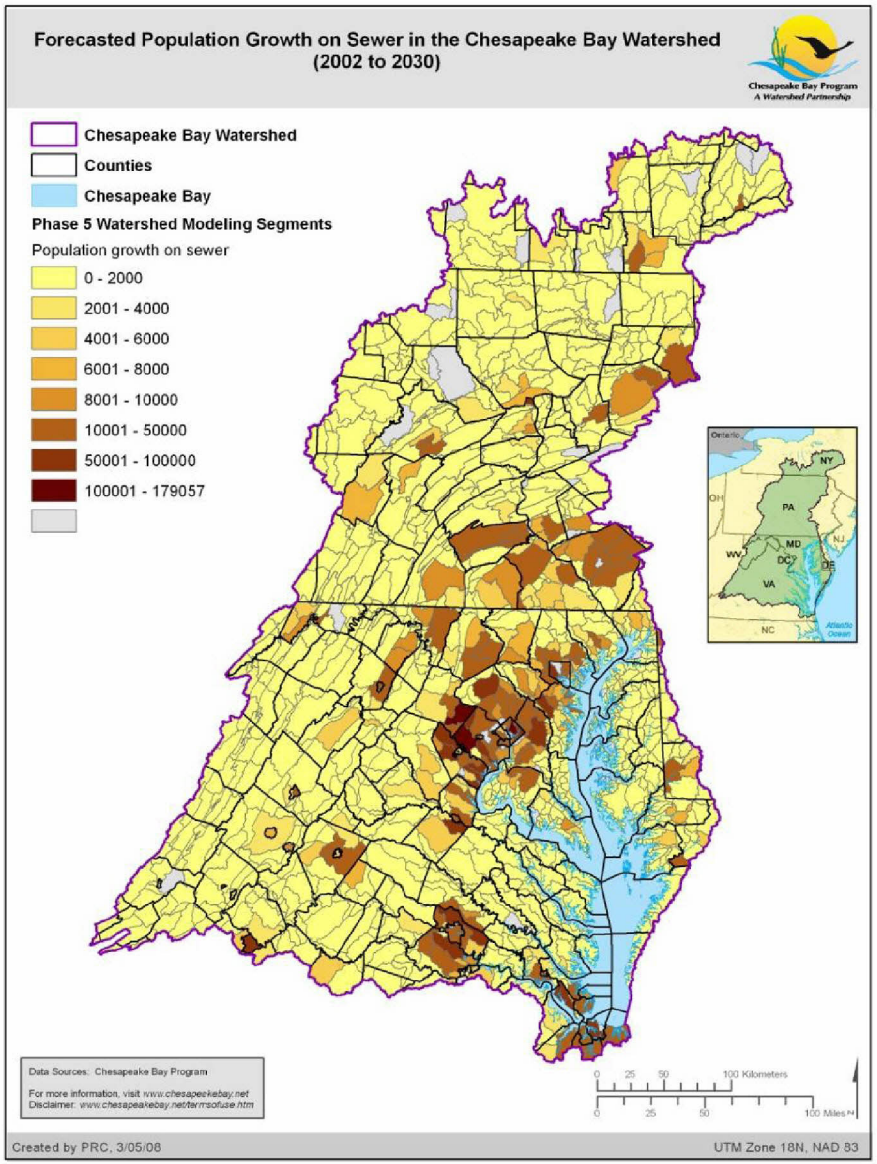


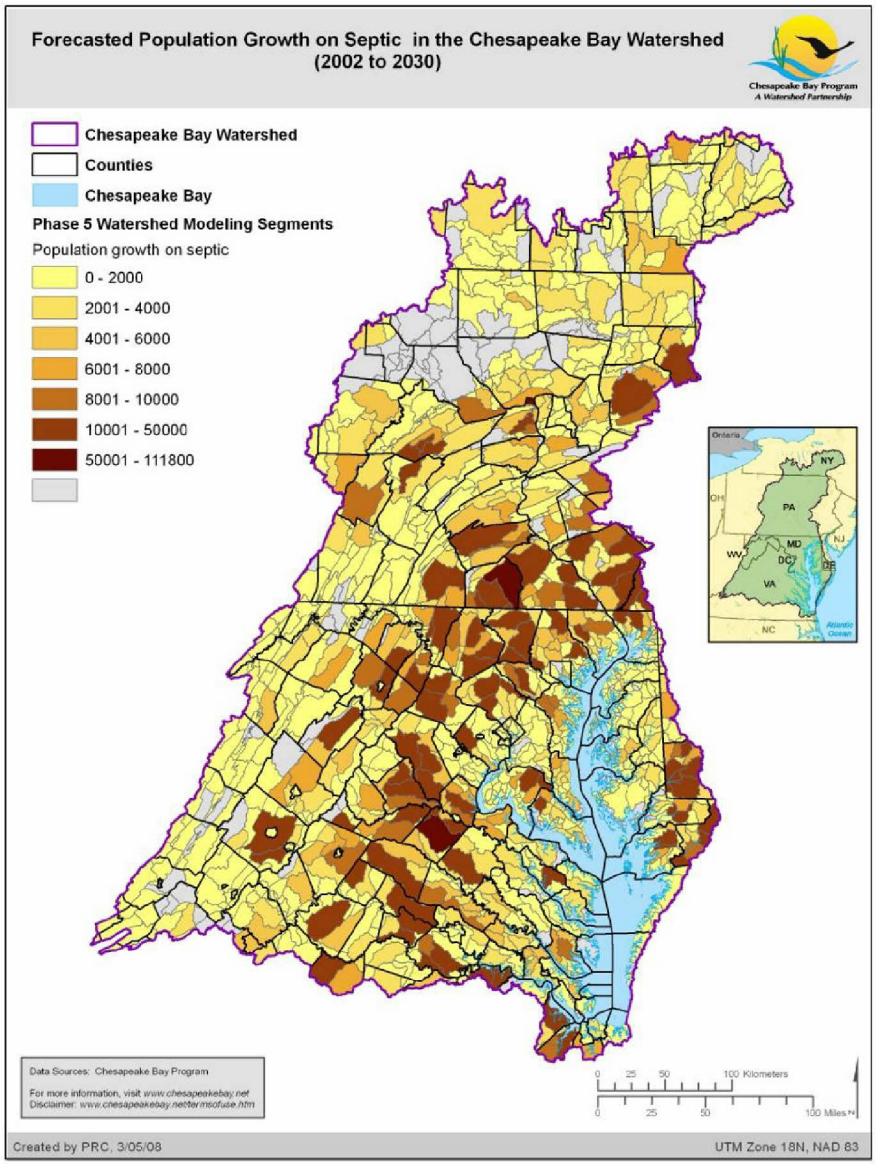
Management Applications

- Establish benchmark expectations of the magnitude, location, and impact of urban development in the Bay watershed through the year 2030
- Inform Watershed Implementation Plans in the absence of alternative local or state forecasts.
- Starting point for considering and discussing the potential implications of urban growth on Bay water quality.

Source: Chesapeake Bay Land Change Model Version 3

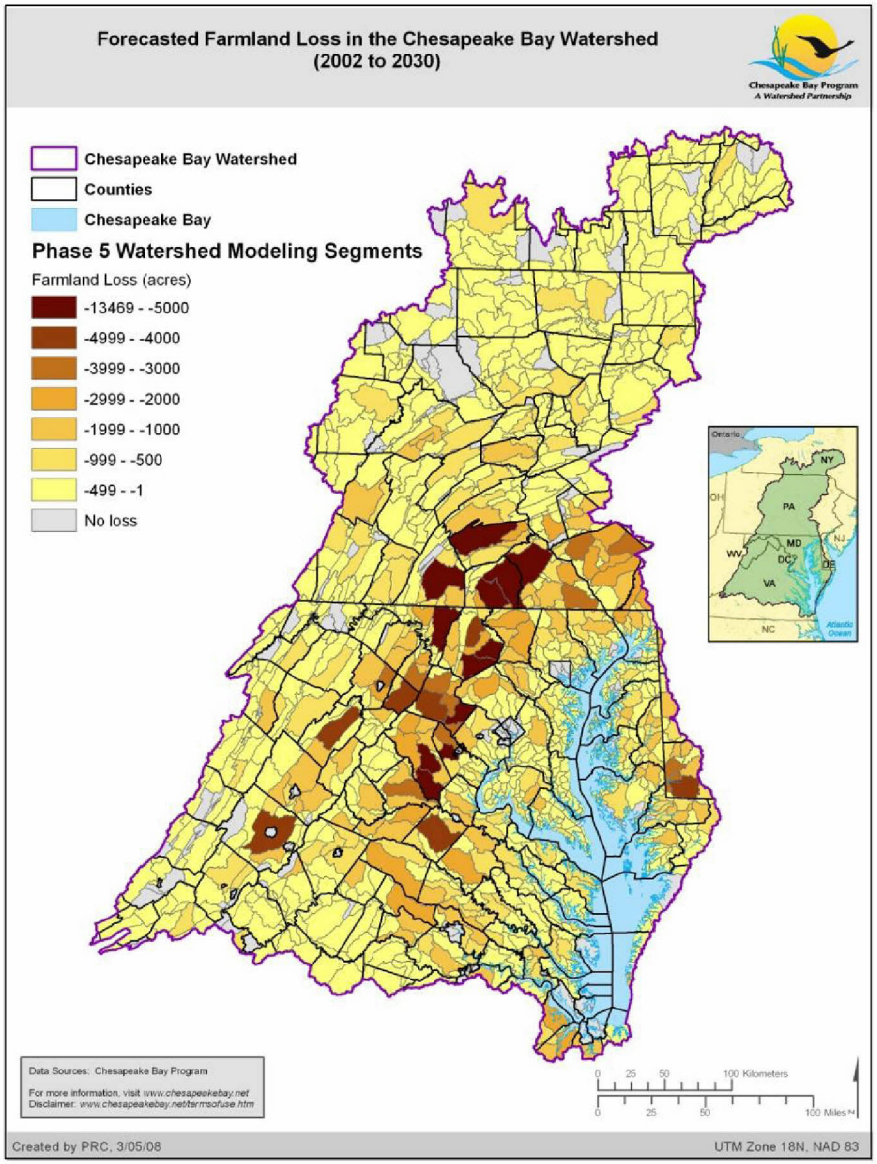
Forecasted Population Growth on Sewer vs. Septic (2000 to 2030)

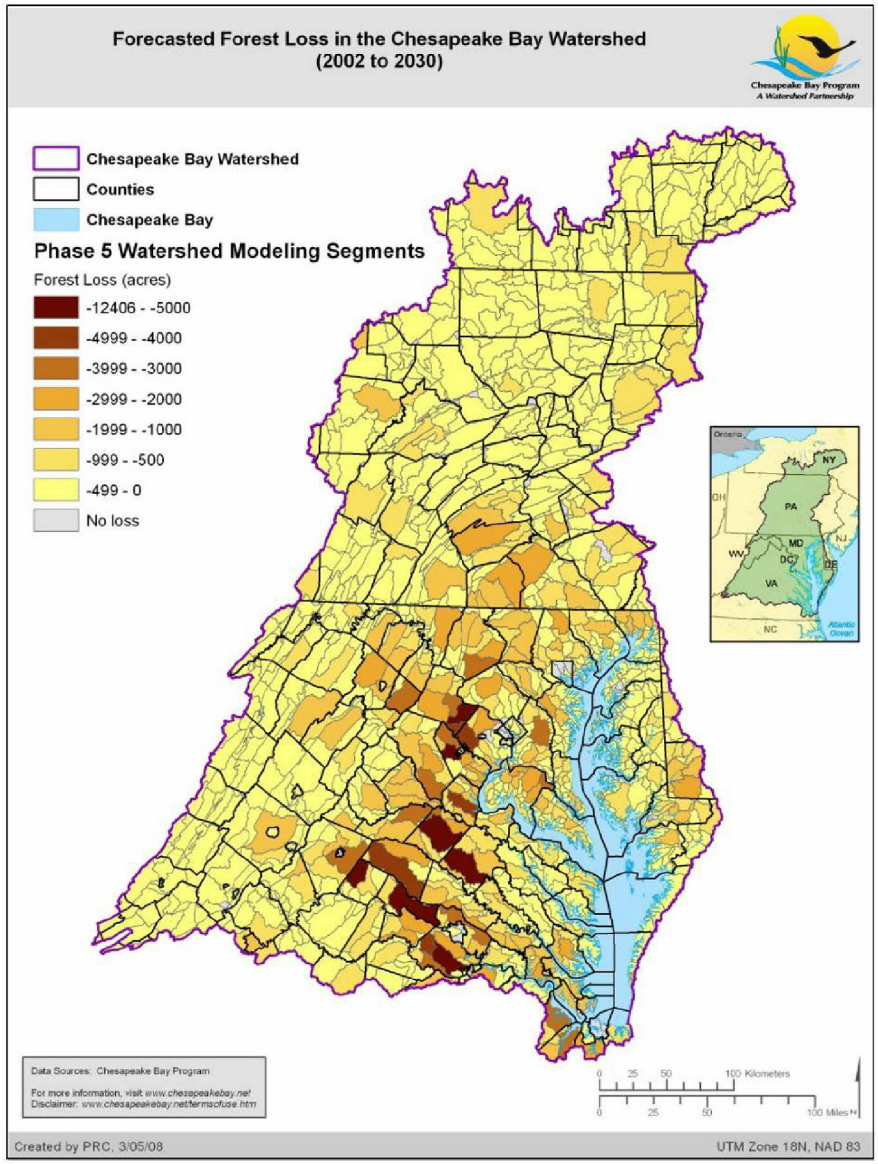




Source: Chesapeake Bay Land Change Model Version 3

Farmland and Forest Land Loss (2000 to 2030)

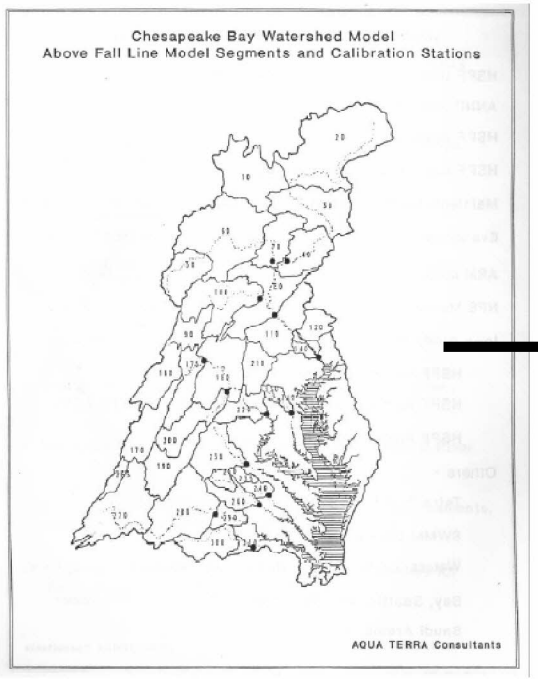




Source: Chesapeake Bay Land Change Model Version 3

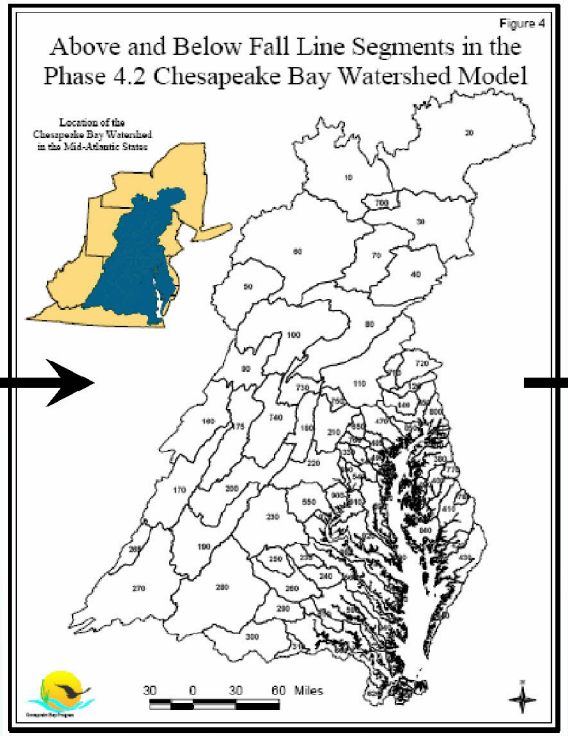
A Quarter Century of Watershed Model Development

Phase 1



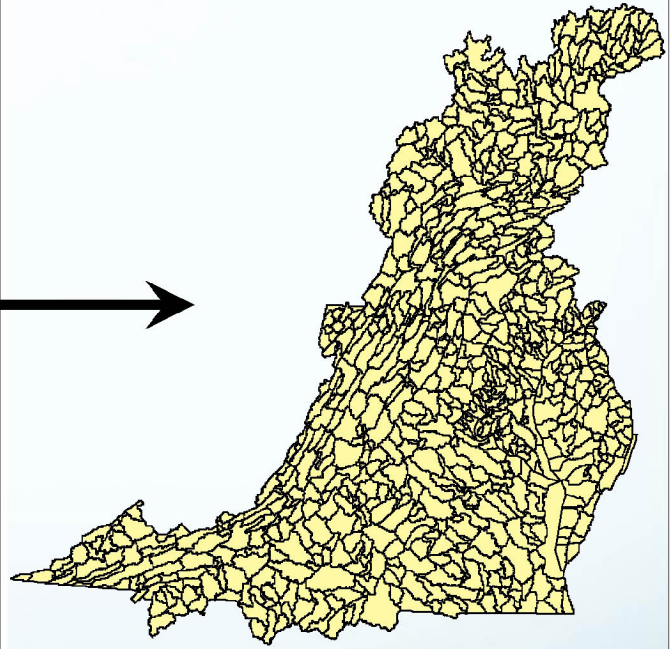
- Completed in 1982
- 63 model segments
- 5 land uses
- 2 year calibration period (March- October)

Phase 4



- Completed in 1998
- 94 model segments
- 9 land uses
- 14 year calibration period (1984-97)

Phase 5

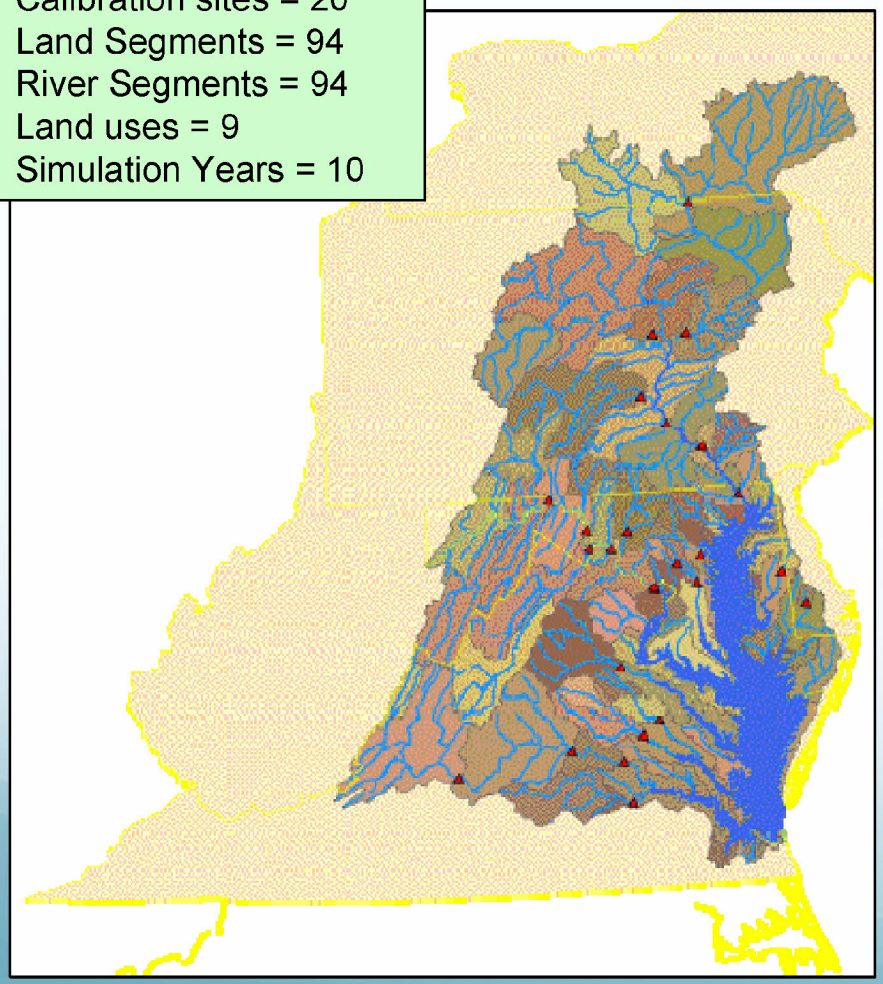


- May 2009 roll-out (Phase 5.1)
- ~ 1,000 model segments
- 25 land uses using time-varying land use & BMPs
- 21 year calibration period (1985-2005)

Finer Segmentation and Longer Simulation Periods Increases the Calibration Sites By An Order of Magnitude

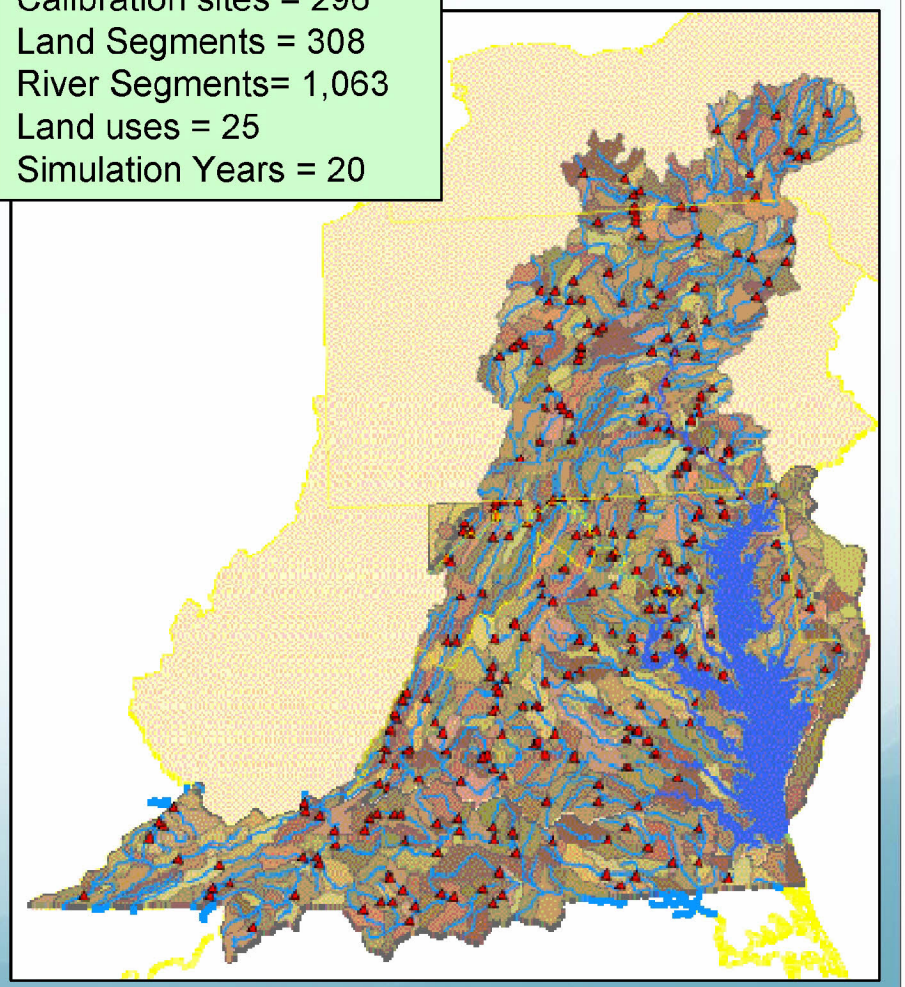
Phase 4 Segmentation and Calibration Sites

Calibration sites = 20
Land Segments = 94
River Segments = 94
Land uses = 9
Simulation Years = 10



Phase 5 Segmentation and Calibration Sites

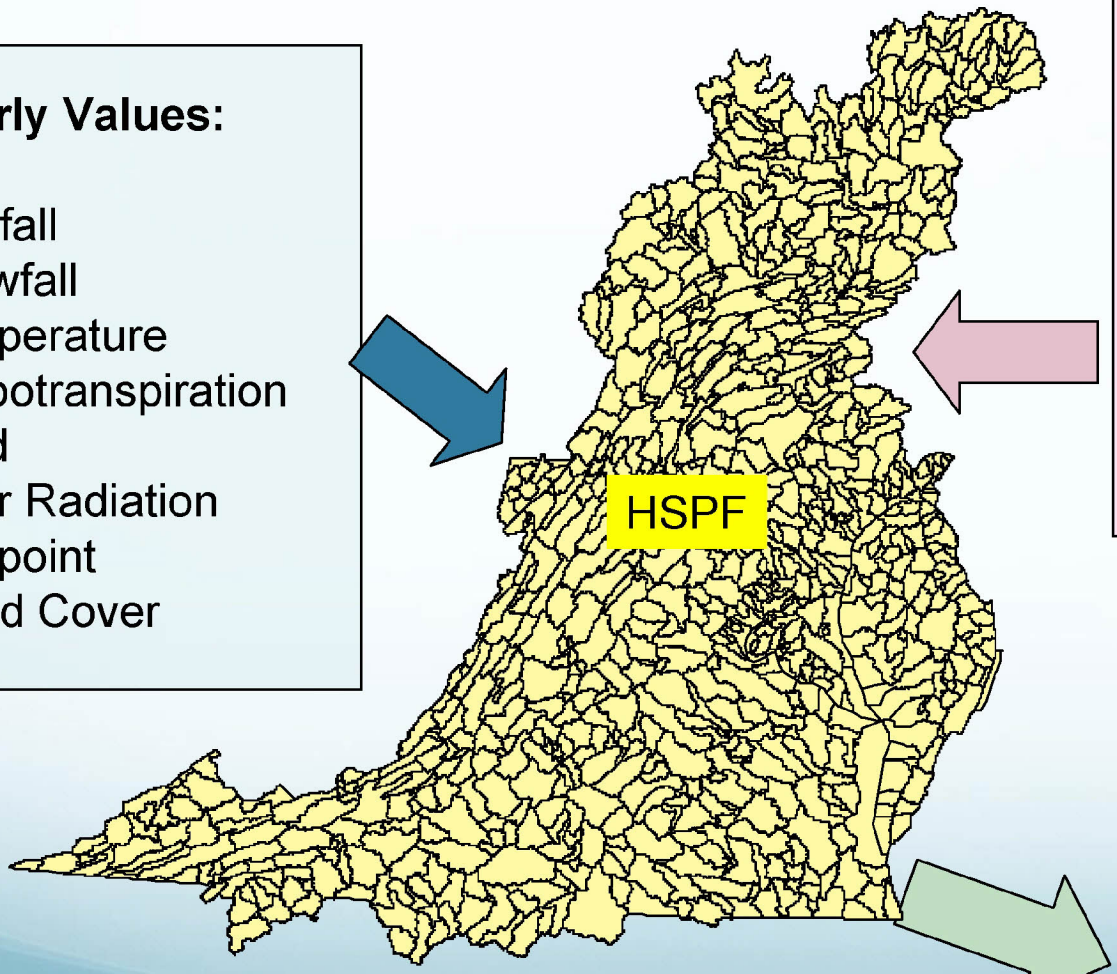
Calibration sites = 296
Land Segments = 308
River Segments= 1,063
Land uses = 25
Simulation Years = 20



How the Watershed Model Works

Hourly Values:

Rainfall
Snowfall
Temperature
Evapotranspiration
Wind
Solar Radiation
Dewpoint
Cloud Cover



Annual or Monthly:

Land Use Acreage
BMPs
Fertilizer
Manure
Atmospheric Deposition
Point Sources
Septic Loads

Daily output compared
To observations

How the Watershed Model Works

Each segment consists of separately-modeled land uses:

- High Density Pervious Urban
- High Density Impervious Urban
- Low Density Pervious Urban
- Low Density Impervious Urban
- Construction
- Extractive
- Combined Sewer System

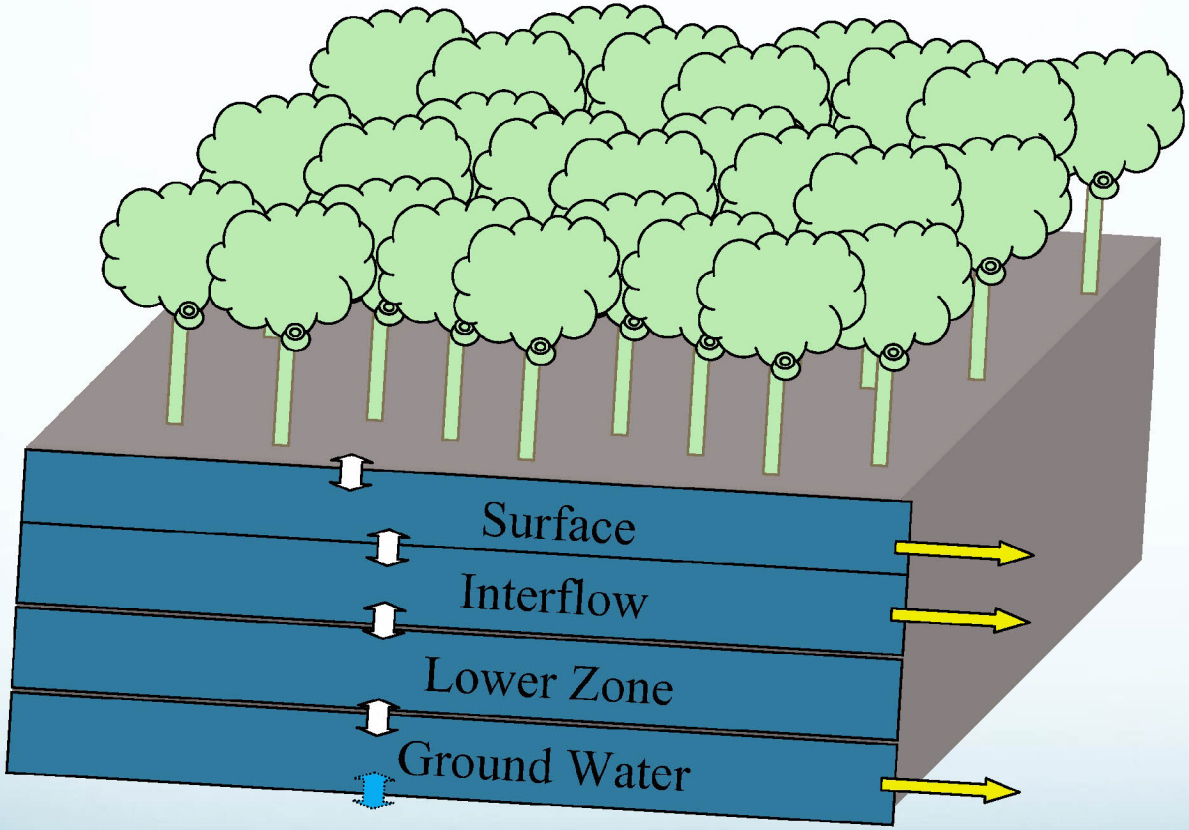
Plus: Point Source and Septic Loads, and Atmospheric Deposition Loads

- Corn/Soy/Wheat rotation (high till)
- Corn/Soy/Wheat rotation (low till)
- Other Row Crops
- Alfalfa
- Nursery
- Pasture
- Degraded Riparian Pasture
- Manure Areas
- Fertilized Hay
- Unfertilized Hay
  - Nutrient management versions of the above

Each calibrated to nutrient and Sediment targets

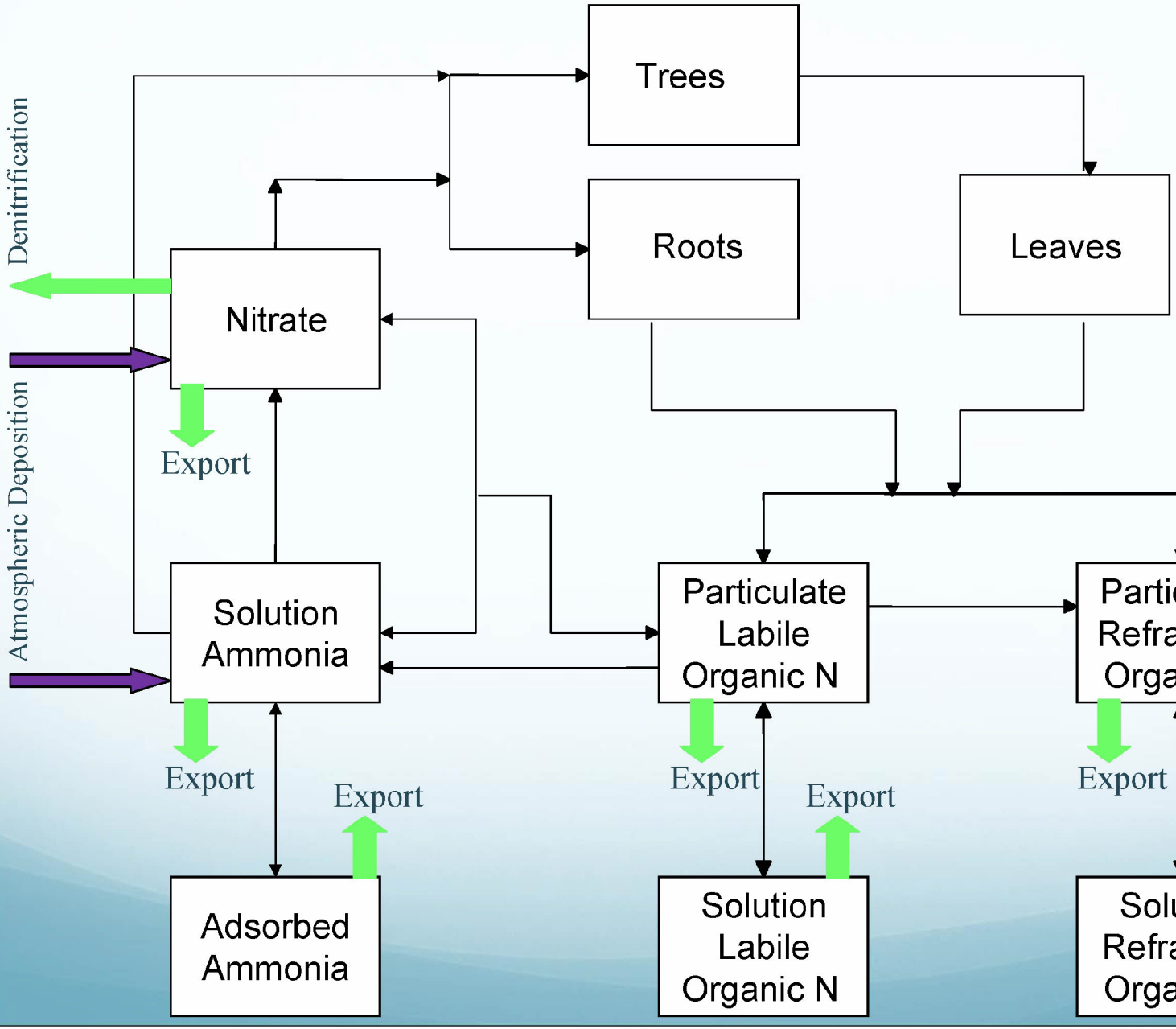
How the Watershed Model Works

Each land use type is divided into four soil layers:



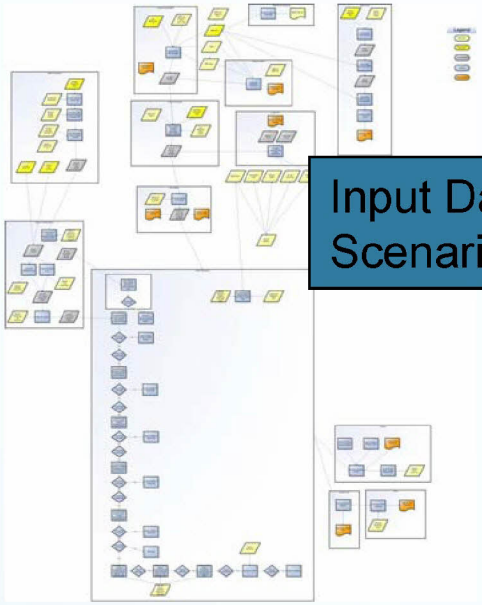
Composed of Water, Sediment, Nitrogen, and Phosphorus submodels

How the Watershed Model Works

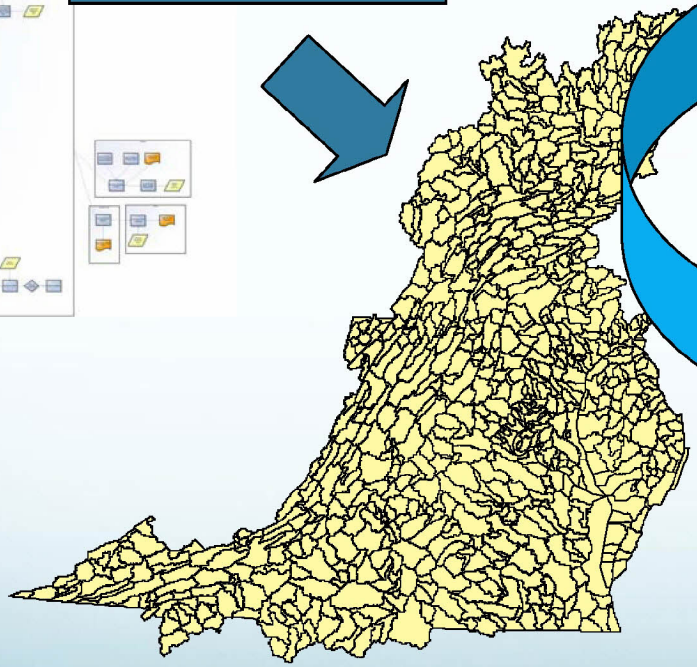


Each submodel has a complex hydrologic or nutrient cycling structure.

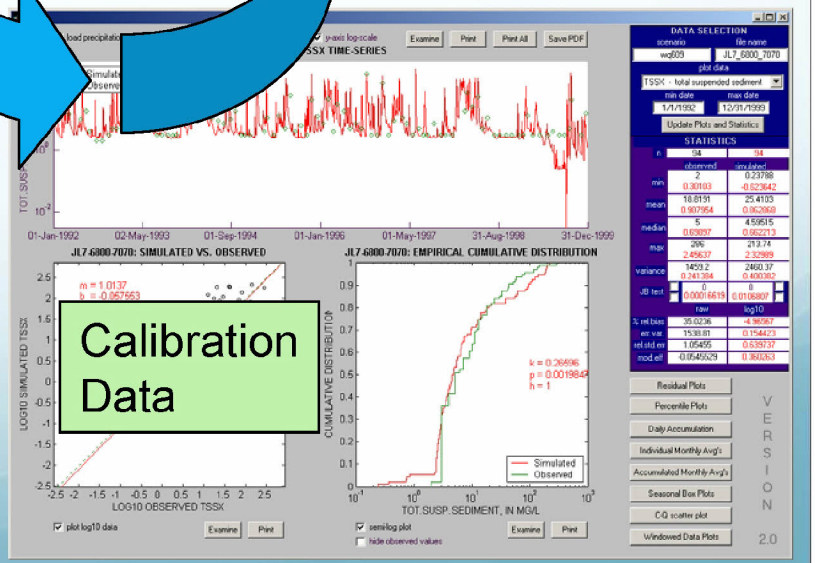
Automated Calibration



Input Data
Scenario Builder

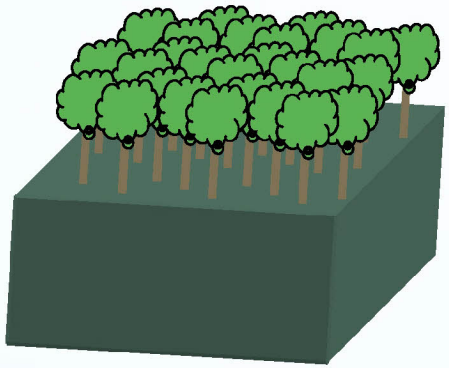


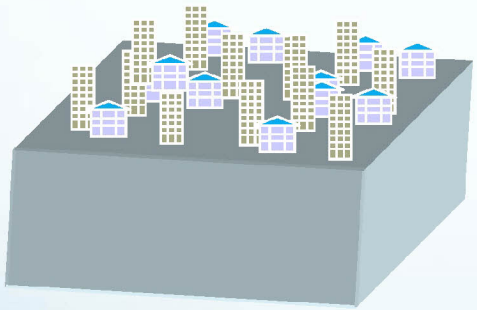
Calibration
Procedures

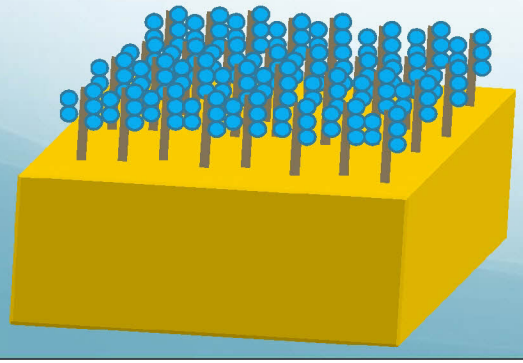


Calibration
Data

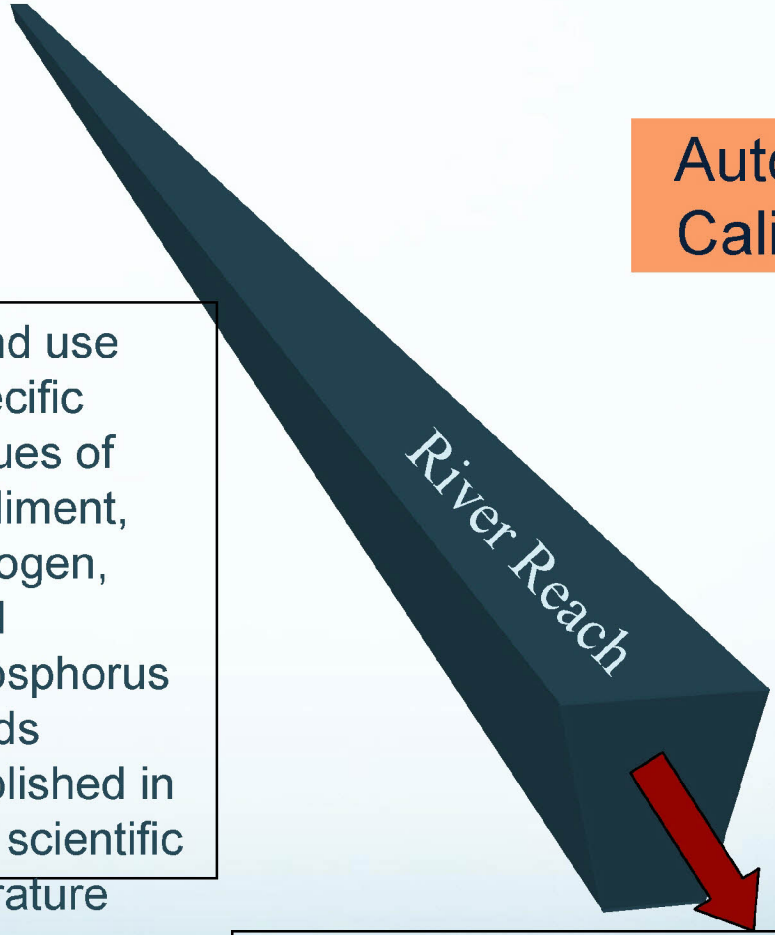
Where do we calibrate?







Land use specific values of sediment, nitrogen, and phosphorus loads published in the scientific literature

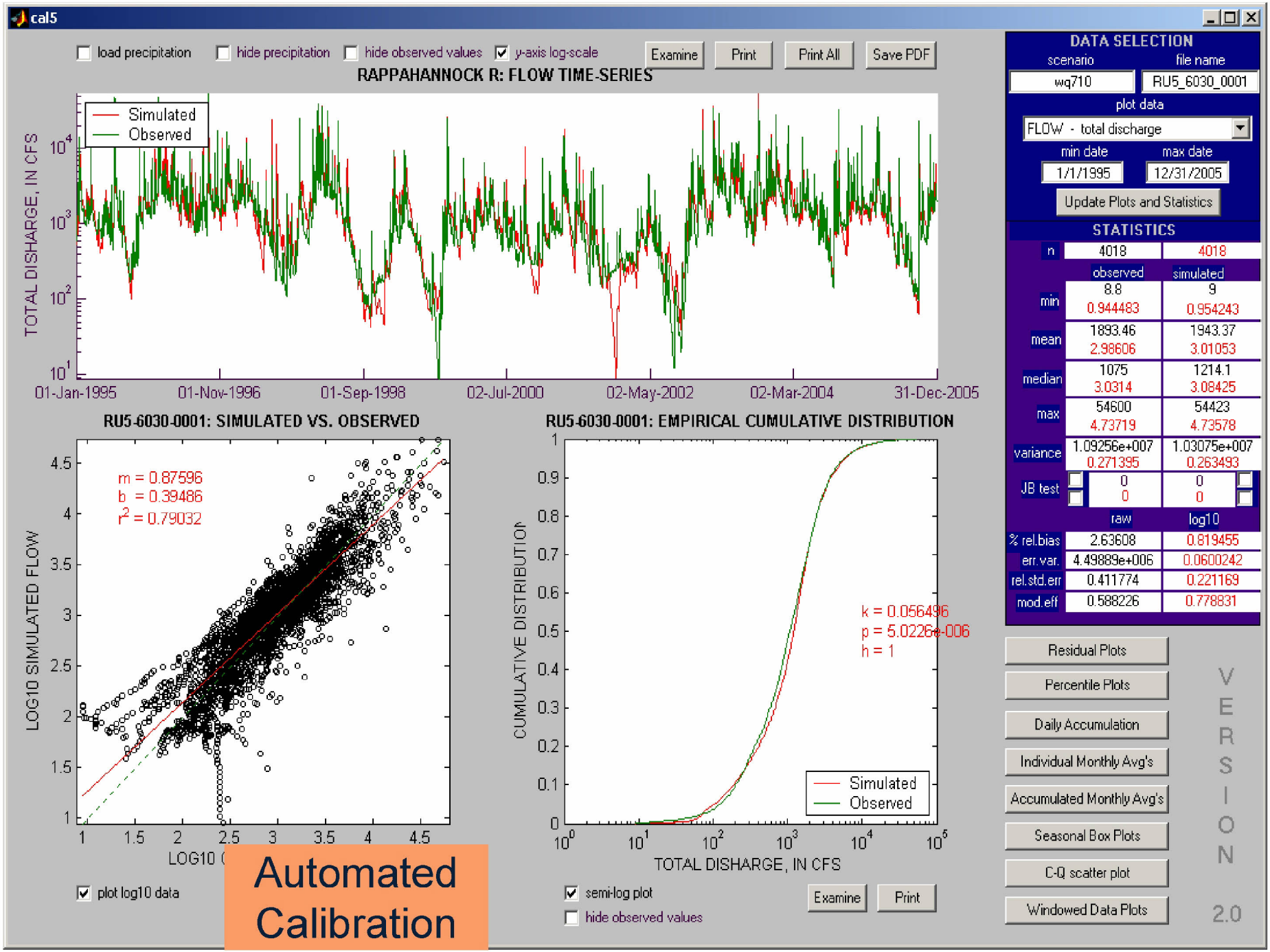


Automated Calibration

Monitored observations of flow, sediment, nitrogen, and phosphorus

Calibration Strategy

- Match observations in rivers
  - Stream flow
  - In-stream concentration data
- Match literature and other models
  - Reasonable rates of nutrient export
  - USGS estimator and SPARROW empirical models
- Match properties and trends
  - Groundwater recession curve
  - Crop uptake of Nitrogen


cal5
load precipitation
hide precipitation
hide observed values
y-axis log-scale
Examine
Print
Print All
Save PDF
RAPPAHANNOCK R: FLOW TIME-SERIES
Simulated
Observed
TOTAL DISHARGE, IN CFS
01-Jan-1995
01-Nov-1996
01-Sep-1998
02-Jul-2000
02-May-2002
02-Mar-2004
31-Dec-2005
RU5-6030-0001: SIMULATED VS. OBSERVED
m = 0.87596
b = 0.39486
r2 = 0.79032
LOG10 SIMULATED FLOW
plot log10 data
RU5-6030-0001: EMPIRICAL CUMULATIVE DISTRIBUTION
CUMULATIVE DISTRIBUTION
k = 0.056496
p = 5.0226e-006
h = 1
TOTAL DISHARGE, IN CFS
semi-log plot
hide observed values
Examine
Print
DATA SELECTION
scenario
file name
wq710
RU5_6030_0001
plot data
FLOW - total discharge
min date
max date
1/1/1995
12/31/2005
Update Plots and Statistics
STATISTICS
n 4018 4018
observed simulated
min 8.8 9
0.944483 0.954243
mean 1893.46 1943.37
2.98606 3.01053
median 1075 1214.1
3.0314 3.08425
max 54600 54423
4.73719 4.73578
variance 1.09256e+007 1.03075e+007
0.271395 0.263493
JB test 0 0
0 0
raw log10
% rel.bias 2.63608 0.819455
err.var. 4.49889e+006 0.0600242
rel.std.err 0.411774 0.221169
mod.eff 0.588226 0.778831
Residual Plots
Percentile Plots
Daily Accumulation
Individual Monthly Avg's
Accumulated Monthly Avg's
Seasonal Box Plots
C-Q scatter plot
Windowed Data Plots
VERSION 2.0
Automated Calibration

Quick Overview of Watershed Model Scenarios

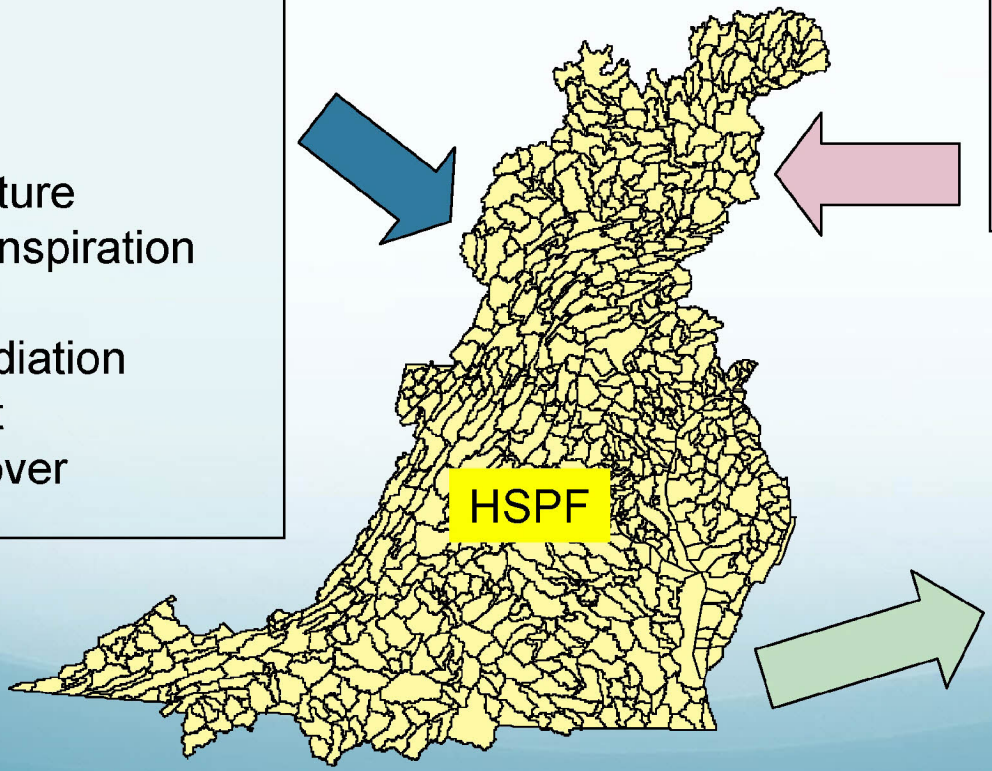
Hourly output is summed over 10 years of hydrology to compare against other management scenarios

Snapshot:

Land Use Acreage
BMPs
Fertilizer
Manure
Atmospheric Deposition
Point Sources
Septic Loads

Hourly Values:

Rainfall
Snowfall
Temperature
Evapotranspiration
Wind
Solar Radiation
Dewpoint
Cloud Cover



1991-2000

"Average Annual Flow-Adjusted Loads"

CBP Agricultural BMPs

Nutrient Management
- Nutrient Management
- Precision Agriculture
- Enhanced Nutrient Management

Conservation Tillage
- Continuous No-Till
- Other Conservation Tillage

Cover Crops
- Cover Crops – Late Planting
- Cover Crops – Early Planting
- Small Grain Enhancement – Late Planting
- Small Grain Enhancement – Early Planting

Pasture Grazing BMPs
- Off-Stream Watering with Fencing
- Off-Stream Watering without Fencing
- Off-Stream Watering with Fencing and Rotational Grazing
- Precision or Intensive Rotational Grazing

Other Agricultural BMPS
- Forest Buffers
- Wetland Restoration
- Land Retirement
- Grass Buffers
- Tree Planting
- Carbon Sequestration/Alternative Crops
- Conservation Plans/SCWQP
- Animal Waste Management Systems
- Mortality Composters
- Water Control Structures
- Horse Pasture Management
- Non-Urban Stream Restoration
- Poultry Phytase
- Poultry Liter Management
- Dairy Precision Feed and/or Forage Management
- Swine Phytase
- Ammonia Emissions Reductions

CBP Urban/Suburban BMPs

Other Urban/Suburban BMP

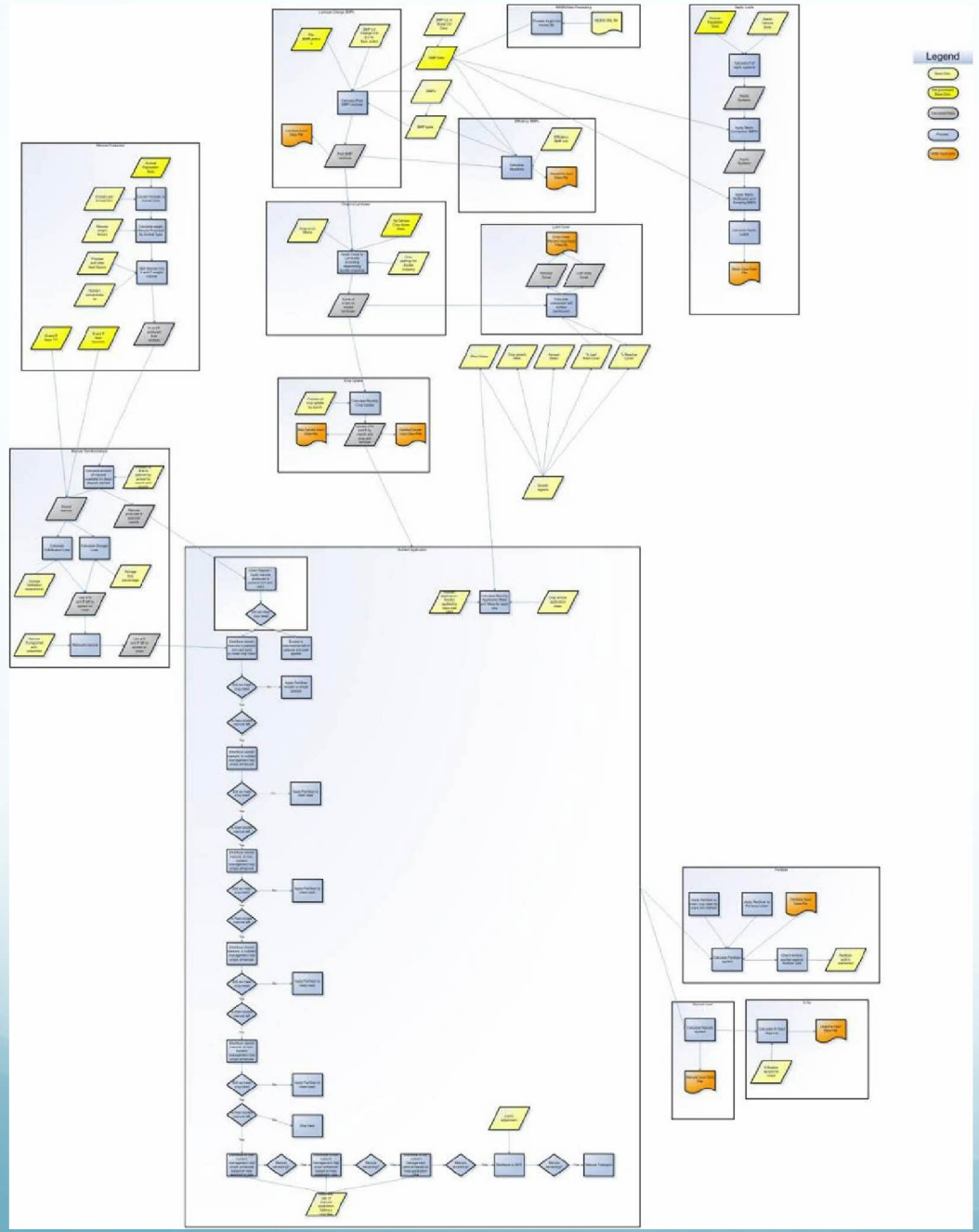
- Forest Conservation
- Impervious Surface and Urban Growth Reduction
- Forest Buffers (Urban)
- Tree Planting (Urban)
- Grass Buffers (Urban)
- Stream Restoration (Urban)
- Erosion and Sediment Control
- Nutrient Management (Urban)
- Street Sweeping
- Forest Buffers (Mixed Open)
- Wetland Restoration (Mixed Open)
- Tree Planting (Mixed Open)
- Nutrient Management (Mixed Open)
- Abandoned Mine Reclamation
- Non-Urban Stream Restoration (Mixed Open)
- Dirt and Gravel Road Erosion and Sediment Control (Mixed Open)

Stormwater Management

- Wet Ponds and Wetlands
- Dry Detention Ponds and Hydrodynamic Structures
- Dry Extended Detention Ponds
- Urban Infiltration Practices
- Urban Filtering Practices
- Recent/Retrofit Stormwater Management

Septic BMPs

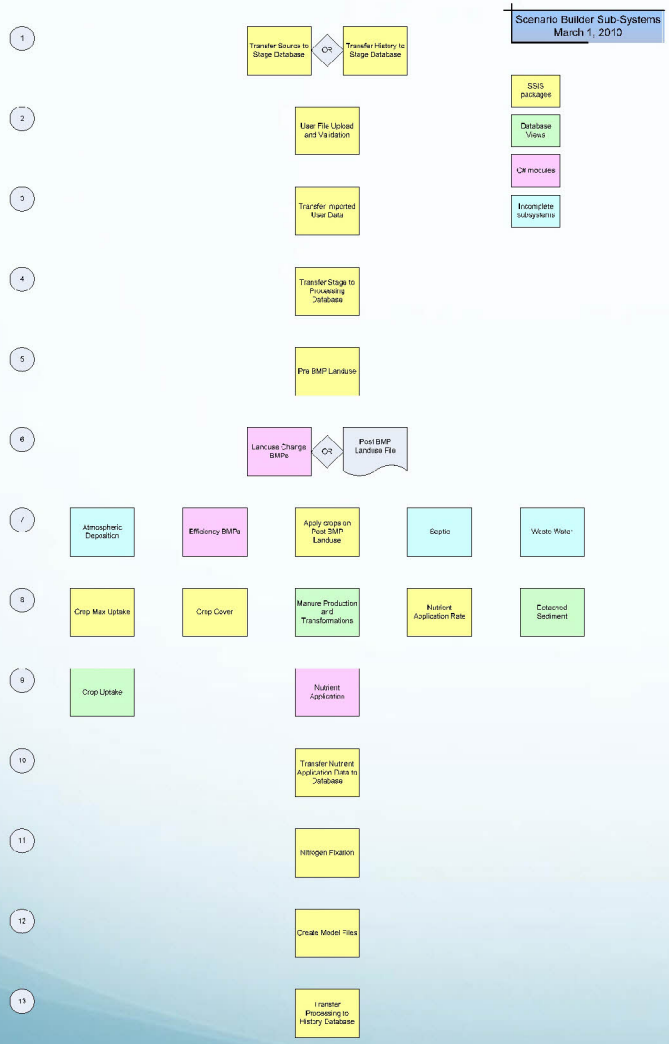
- Septic Connections
- Septic Denitrification
- Septic Pumping



Scenario Builder

A modeling program that simulates non-point source processes in order to enhance the accuracy and precision of the Phase 5 Chesapeake Bay Watershed Model

Scenario Builder Components



Summary of Processes:

1) Apply land use change BMPs to reported land use
2) Apply BMP efficiencies and then crops to land uses
3) Calculate: maximum crop uptake, crop cover, manure production and transformation, nutrient application rate, detached sediment
4) Calculate actual crop uptake
5) Apply nutrients and log application rates
6) Simulate nitrogen fixation
7) Make input files for watershed model and log history

Documentation:

Estimates of County-Level Nitrogen and Phosphorus Date for Use in Modeling Pollutant Reduction

Inputs

- BMP Type and location (NEIEN/State supplied)
- Land acres
- Remote Sensing, NASS Crop land Data layer
- Crop acres
- Yield
- Animal Numbers (Ag Census or state supplied)
- Land applied biolsolids
- Septic system (#s)

Parameters

(Changeable by user)

- BMP types and efficiencies
- Land use change (BMPs, others)
- RUSLE2 Data: % Leaf area and residue cover
- Plant and Harvest dates
- Best potential yield
- Animal factors (weight, phytase feed, manure amount and composition)
- Crop application rates and timing
- Plant nutrient uptake
- Time in pasture
- Storage loss
- Volatilization
- Animal manure to crops
- N fixation
- Septic delivery factors

Outputs

- BMPs, # and location
- Land use
- % Bare soil, available to erode
- Nutrient uptake
- Manure and chemical fertilizer (lb/segment)
- N fixation (lb/segment)
- Septic loads

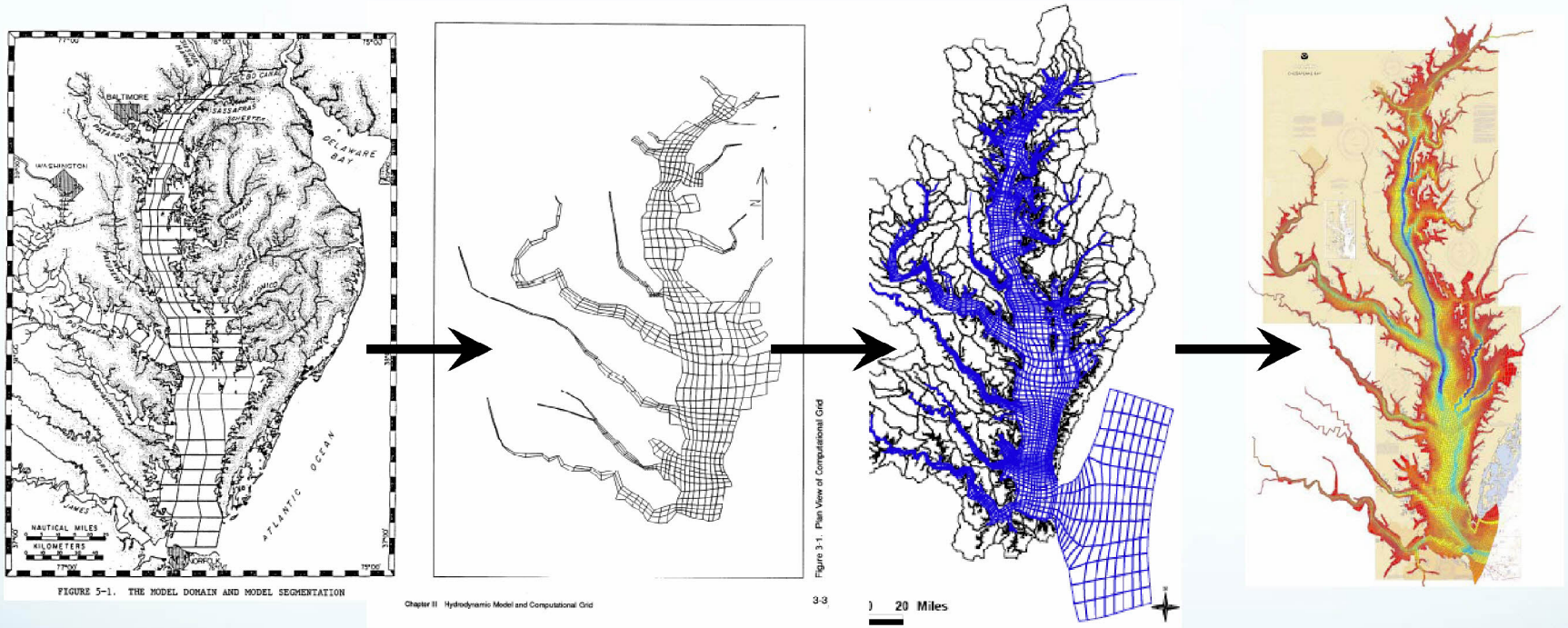
Scenario Builder Outputs to Chesapeake Bay Watershed Model

- BMPs
  - Descriptions
  - Acres
  - Pounds nitrogen, phosphorus and sediment reduced
- Land uses
- Manure (nutrient species/land use/month)
- Septic system loads
- Cover crops uptake
- Fertilizer application
- Legumes (pounds nitrogen)
- Maximum crop uptake
- Uptake curve (monthly nutrient uptake by land use)

Scenario Builder Planned Enhancements

- **Version 2.2a: System Maintenance and Documentation Release**
  - System documentation updated
- **Version 2.3: Septic and Atmospheric Deposition**
  - Add these are two new sub-systems
- **Version 2.4: BMP Descriptions and Other BMP Files**
  - Accessory BMP files that the model needs to process BMP data from Scenario Builder.
  - Input the Phase 5.3 watershed model outputs
- **Version 2.5: Improve Animal Waste Management System BMPs and Dead Birds**
  - Both are being addressed by BMPs now—will be addressed more accurately
- **Version 2.6: Wastewater Sub System**
  - Will automate input data generation over 3,000 facilities
- **Version 3: NEIEN Exchange**
  - Conversion of NEIEN BMP exchange data into Scenario Builder formats.
- **Version 4: Data Products**
  - Developing reports or other data products that will stream-line the process for states, locals and other partners/stakeholders to request information
- **Version 5: User Interface**
  - Evolution of version 2.2 User Interface for running "what if" scenarios

A Quarter Century of Bay Water Quality Model Development



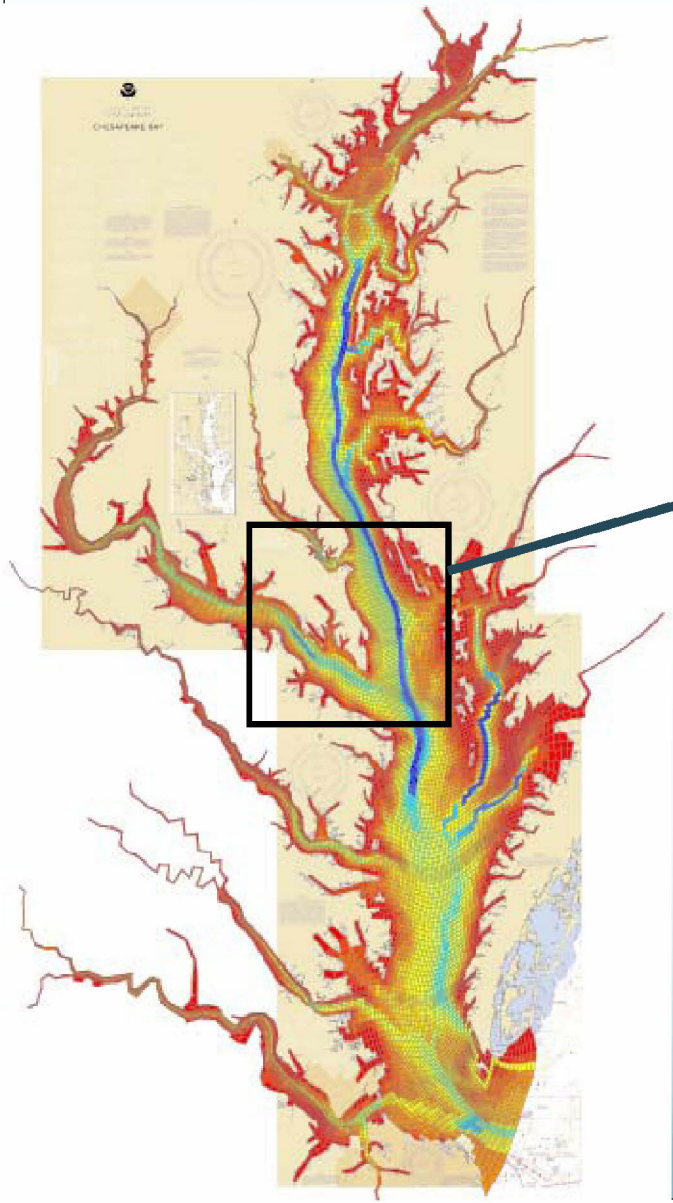
- Completed in 1987
- 2-years
- 584 model cells
- July-Sept steady state

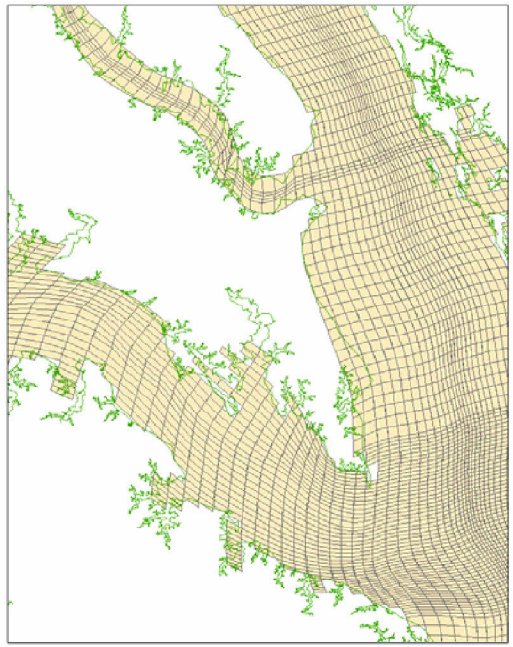
- Completed in 1992
- 4-years
- 5,000 model cells
- Sediment flux

- Completed in 1998
- 10-years
- 12,000 model cells
- SAV, benthos

- Completed in 2010
- 20-years
- 57,000 model cells
- Sediment transport, oysters, menhaden

Chesapeake Bay Water Quality/ Sediment Transport Model





Model includes simulation of:

- Circulation/hydrodynamics/salinity
- Water quality: oxygen, clarity, nutrients, sediments
- Algae
- Zooplankton
- Underwater bay grasses
- Bottom sediment dwelling organisms (benthos)
- Oysters
- Menhaden

Example Post-Processed Bay WQ/ Sediment Transport Model Output

Cbseg	State	1985 Scenario, 420TN 28.4TP	Intermediate C Scenario, 378TN 24.5TP	91 -'00 Base Scenario, 340TN 24.1TP	2002 Scenario, 333TN 20.9TP	Intermediate B Scenario, 279TN 17.2TP	Tributary Strategy 2010a Scenario, 236TN 21.1TP	Intermediate A Scenario, 209TN 13.7TP	2003 Allocation Scenario, 175TN 12.8TP	Intermediate D Scenario, 159TN 12.3TP	E3 2010 Scenario, 138TN 12.0TP	Draft 2008 303(d) Results
	Scenario →	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98	DO Deep Water Monthly '96-'98
CB1TF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CB2OH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CB3MH	MD	3.3%	2.0%	1.9%	1.6%	0.9%	0.4%	0.3%	0.2%	0.0%	0.0%	3.7%
CB4MH	MD	26.3%	23.4%	23.2%	21.7%	18.7%	15.2%	11.6%	8.0%	0.0%	4.5%	19.5%
MD5MH	MD	13.4%	10.7%	10.2%	8.9%	5.5%	3.3%	1.8%	0.6%	0.0%	0.1%	12.1%
VA5MH	VA	3.3%	0.7%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.5%
CB6PH	VA	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
CB7PH	VA	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CB8PH	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BSHOH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GUNOH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MIDOH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BACOH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PATMH	MD	12.7%	9.1%	8.3%	4.9%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	10.9%
MAGMH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SEVMH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SOUMH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RHDMH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WSTMH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WBRTF	MD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PAXTF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAXOH	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAXMH	MD	14.6%	4.9%	4.5%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.6%
DCPTF	DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MDPTF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POVTF	VA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MDATF	MD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DCATF	DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Access to More Information

- For more information and supporting materials of the WIP and TMDL process and expectations please see:
  - http://www.chesapeakebay.net/marylandbmp.aspx?menuitem=34449
- Information on the Bay Watershed Model can be found at:
  - http://ches.communitymodeling.org/models/CBPhase5/index.php
  - ftp://ftp.chesapeakebay.net/modeling/phase5/community/p52An/

CHESAPEAKE BAY COMMISSION

Policy for the Bay

Ann Swanson
Executive Director
Chesapeake Bay Commission

TMDL Webinar
March 25, 2010

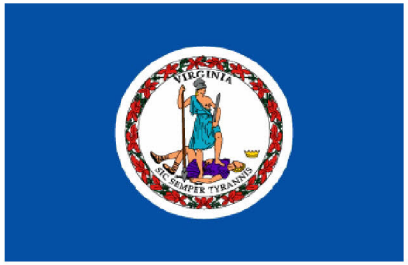
Who is the CHESAPEAKE BAY COMMISSION*?*

- ✓ **Policy Leader in Chesapeake Bay restoration**
- ✓ **Tri-State Legislative Commission created in 1980**
  - Maryland
  - Pennsylvania
  - Virginia
- ✓ **21 Members**
  - 15 General Assembly Members
  - 3 Governors
  - 3 Citizens
- ✓ **Offices in all three states/staff of 5**

CHESAPEAKE BAY PROGRAM *Leadership*

Governor of MD

Governor of VA



Governor of PA

Executive Council

Chesapeake Bay Program

EPA Administrator

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Mayor of DC

Chair of Chesapeake Bay Commission

CHESAPEAKE BAY COMMISSION
MARYLAND • PENNSYLVANIA • VIRGINIA

Major State Policy Contributions

Examples:

- Nutrient Management Planning
- Phosphate Detergents and Fertilizers
- Land Conservation
- Sediment and Erosion Control
- Stormwater Management
- Sewage Facilities Funding
- Farmland Conservation
- Growth Policy
- Crab policy
- Fisheries management
- Air
- Biofuels and bioenergy

and much more…

Major Federal Policy Contributions

and much more…

Examples:

- Bay Agreements and 1992 Amendments
- Directives
- Recreational Boating
- Ballast Water
- Reauthorization of Bay Program (now!)
- Farm Bill
- Establishment of Federal Offices
  - NOAA
  - Forest Service
  - National Park Service
- John Smith Water Trail
- Annual appropriations (now!)
- Federal Executive Order
- Economic Stimulus

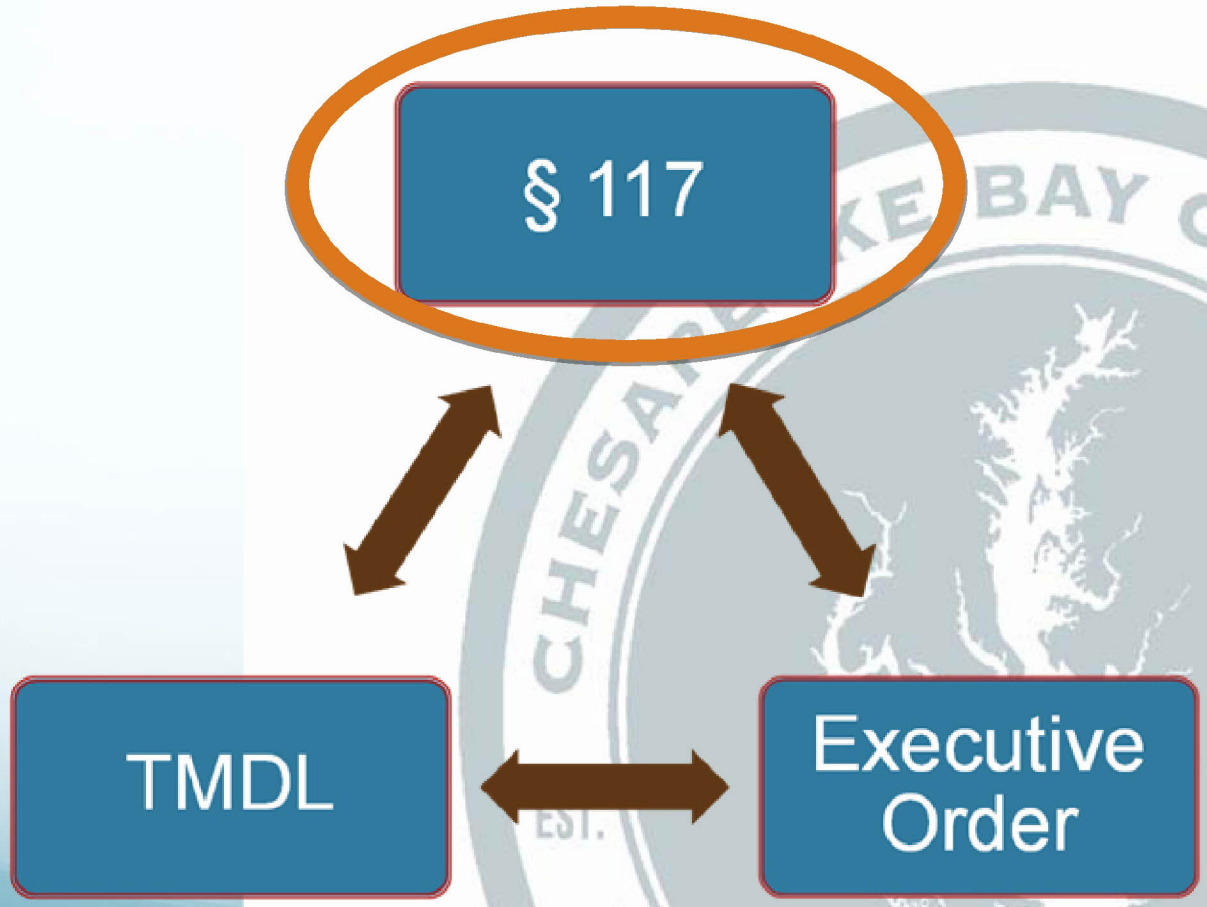
Major Funding Contributions

Example

FOR FY2010, the Commission played a direct role in bringing in $130 million in Federal Restoration funds to the Bay Program, much of which flows to the six states. Compared to the three state apportionment of $225,000 each, the Commission has leveraged $197 for every $1 invested.

...not including formula allocations.

Current Federal Efforts:
Policy approaches



Clean Water Act Section 117

Section 117 of the Clean Water Act, which establishes the Chesapeake Bay Program and sets Federal water quality policy specifically for the Bay watershed, was first added to the Clean Water Act in 1987, reauthorized in 2000, and expired in 2005.

* It needs to be reauthorized again. There is no firm deadline to do this.

S. 1816 and HR. 3852

Chesapeake Clean Water and Ecosystem Restoration Act

The bills change Section 117 by:

1. Codify the Bay TMDL process and clarify the proces for evaluating nonpoint source
2. Ensure Accountability with Consequences
3. Expand Funding

S. 1816 and HR. 3852

The bills change Section 117 by:

4. Stormwater in new development
5. Establish Baywide nutrient trading
6. Requires annual federal action plan

CBC Interest:

Dual Goals of Clean Water & Sustainable Agriculture

Ag Modifications Requested
in Cardin/Cummings legislation:

- Recognition of contribution
- Safe harbor
- Technical assistance
- Accurate data collection
- Independent review of trading
- Centers for Agricultural Water Quality Innovation
- Agricultural growth is protected

House Agriculture Alternative:

Holden/Wittman Language


It’s not over until…
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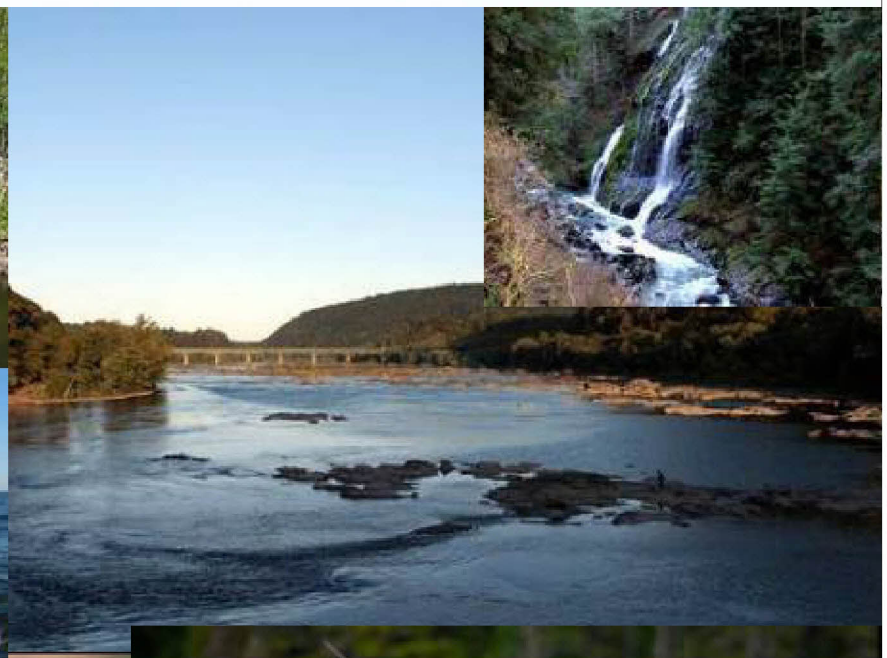
Further Information

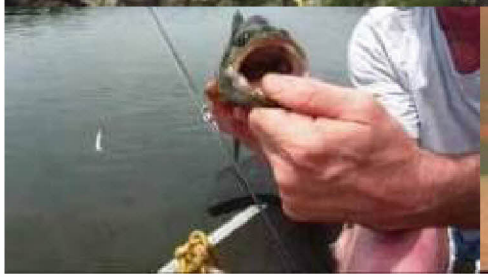
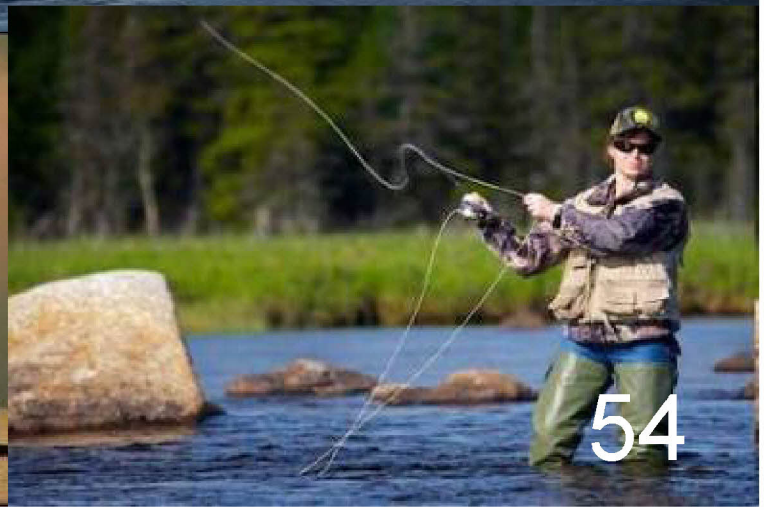
- Chesapeake Bay Commission
  - Ann Swanson, Executive Director
    - aswanson@chesbay.us; 410-263-3420
  - www.chesbay.state.va.us
- U.S. EPA Region 3 Contacts
  - Water Protection Division
    - Bob Koroncai
      - 215-814-5730; koroncai.robert@epa.gov
    - Jennifer Sincock (sincock.jennifer@epa.gov)
  - Chesapeake Bay Program Office
    - Rich Batiuk
      - 410-267-5731; batiuk.richard@epa.gov
    - Katherine Antos (antos.katherine@epa.gov)
  - **www.epa.gov/chesapeakebaytmdl**

Questions & Comments







Thank you for your participation!

That concludes today's webinar.